global POLICY

Chinese blockchain: convergence around a Beijing-aligned strategy

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Abstract

Innovation ecosystems are said to vary across China. By examining all the startups operating in just one vertical – blockchain – across Beijing, Shanghai and Shenzhen, we show that there is increasing convergence in the form of Beijing-styled innovation, which is operating in line with the central government's aims for the technology and sees the state as the target customer segment. Because of the importance of the technology to party leadership, Beijing, not China's tech powerhouse, Shenzhen, is the most active cluster. Bans on cryptocurrency and policies motivated by national security dampen the entrepreneurial environment for other flavors of blockchain innovation.

Policy Recommendations

- **Prioritize economic opportunity**. At present, the state is inconsistent and restrictive, mixing both economic growth aims and national security risks. This has caused dilemmas, with the result being downward pressure on entrepreneurs' ability, or willingness, to operate in an environment identified as a national security risk. A clearer indication of the prioritization of economic opportunity could help enable a more creative, and varied, field of blockchain entrepreneurs.

- **Policy coordination using the Shenzhen special economic zone as a template.** Experiences generated from Shenzhen's development – which benefitted from a coordinated institutional approach – could offer a template for the state's engagement. A mechanism helping integrate different institutional functions and ecosystem actors could offer more certainty for would-be entrepreneurs, and benefit from the tradition of policy experimentation that has served China's innovation system's historical growth.

- **Make accountability clear for entrepreneurs**. Entrepreneurs often find it difficult to figure out to whom they should be accountable. The policy actors should explain and pave a clear way for entrepreneurs to navigate.

China's innovation system is at a crucial inflection point. In a bid to deliver "common prosperity" and technological superiority, particularly over the U.S., *The Economist* recently observed that Xi Jinping's government is "taking firmer control over markets." Businesses – especially in the technology sector – increasingly rely on the state as a crucial customer and determinant of what they can, and can't, do. For instance, as the Xi government has cracked down on cryptocurrency, it has also sponsored the growth and even international expansion of firms, like the Blockchain-based Service Network (BSN), which offers infrastructure around the technology, linking different blockchains together.

In a recent special issue of *Global Policy,* Hong Liu, Celia Lee and Chris Alden broached the question of what China's assertion means, especially as it concomitantly aims to actively export its model elsewhere. We pick up on this aim, in light of the increasingly visible hand of the Chinese state in the technology sector, to understand exactly what would be exported in terms of a techno-political model. In doing so, we contribute to a growing discussion regarding the dynamic relationships between the Chinese state and blockchain-empowered technological innovation. Gruin and Knaack (2020) asserted that China's financial system is mobilised to adopt the blockchain technology for political legitimacy building. In a similar vein, Hou (2017) observed how blockchain technology is practised in China's E-Governance system and its effect on the state's capacity. However, a critical and essential question remains underexplored: how is the Chinese blockchain innovation ecosystem developing under the expanding central state?

One thing that we observe is that already, the Chinese technology industry has more locally trained talent than it used to, owing to the fact that the market is increasingly mature, and universities top-tier. In a paper last year, we showed that the founders of China's unicorns – high-growth, private companies with valuations of $1 billion or more – are overwhelmingly "made in China", as graduates of Chinese universities and through work experience in one of China's great cities. They are no longer predominantly. "sea turtles", or returnees, who studied and worked in Silicon Valley, returning to China.

The second thing that we observe – and the focus of this article – is that there is increasingly pressure for just one Beijing-flavoured innovation model. This contradicts research that has shown, for years, that China is not a monolith, and that there are different state-business relationships across provinces. For instance, in *Run of the Red Queen,* Dan Breznitz and Michael Murphree detail how the political economy of innovation in Beijing, Shanghai and Shenzhen are distinct, and as such, the nature of innovation itself differs across the metropolitan areas.

In light of an increasingly active Chinese state, the distinctiveness of each hub's "contextual rationality" – meaning a decision-making process that is based in locale-specific norms – may be converging on just one: Beijing's public-sector-as-customer, infrastructure-providing version.

We show this by studying blockchain start-ups in China. We examine all the firms operating in the blockchain vertical – according to Crunchbase as of May 2022 – across Beijing, Shanghai and Shenzhen. More specifically, we analyze the company descriptions of the full set of 197 blockchain companies headquartered in each city; 110 in Beijing, 53 in Shanghai, and 34 in Shenzhen. We use text-as-data methods to assess the companies' target customers, product features, and business models. We used the *Quanteda* text analysis package in R on the Crunchbase descriptions of the 197 companies. We also used the RVEST package in R for web data scraping, to collect text from the companies' websites. To do this, we supplied RVEST with the company links (which came from the Crunchbase dataset), and in return, received a basket of text, pulled from the websites of the companies. We then analysed this text to identify patterns in topics, across product descriptions, target customers, and more.

Blockchain and its governance in China

Blockchain is representative of innovation at the technological frontier. It is defined, by IBM, as ‘a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network’. Blockchain’s core features are its contribution to ‘decentralisation’ and ‘transparency’, as everyone can track and trade on/through the blockchain network, and the transaction record is publicly and immutably available.

In the Chinese context, it has been identified as a critical infrastructure technology by the government, given its potential to contribute to socio-economic development, and almost certainly also due to the risks is poses by its transparent and decentralized nature. The Chinese State Council's *Development Plan for a New Generation of Artificial Intelligence*, promulgated in mid-2017, links the progress of blockchain and related emerging technological innovations, such as artificial intelligence (AI) algorithms and intelligent applications, to the country's future strategic competitiveness and viability. The plan highlights that by 2030, China will develop into an innovative country at the most forefront of the world, and it is profoundly connected to the "Great Rejuvenation of the Chinese Nation". Building on this centrality, the Cyberspace Administration of China issued an official blue paper in 2020, emphasizing that blockchain is crucial to the modernization of a new digital governance capacity and the national governance system.

At the central government level, by the first quarter of 2022, more than thirty central units (bureaus, committees, departments, groups, and ministries) have issued policies regarding the blockchain development and regulations. The top central actors are State Council, Ministry of Industry and Information Technology, Cyberspace Administration, National Development and Reform Commission (NDRC), and the People’s Bank of China (PBOC). At the local government level, by far, all 32 provincial administrative regions (23 Provinces, 4 Municipalities directly under the Central Government, 5 Autonomous regions) have issued blockchain-relevant polies (regulations/announcements/notices).

Policies address risk associated with blockchain, including social governance, information security, economic stability, and financial risk-control. But policies also strive to develop the technology, with blockchain being specified as an emerging and critical infrastructure enabling applications big data, AI, cloud computing, the Internet of Things (IoT), Fintech and other high technologies & innovations.

The government’s approach to blockchain has long been emphasized both its potential to contribute to economic growth and the risks it poses to national security. And this has fuelled immediate, and often incoherent, policy action. For instance, in 2017 the PBOC joint with other six ministries aimed preventing fraud and risk, banned cryptocurrency. Under a central decree, banking transactions, capital/fund raising, information communication and media propaganda (online and offline), technology and innovation R&D activities for different entities (corporates, SOEs, HEIs, other market entities) were halted.

At the local government level, though, there has been more variation:

1. Beijing tends to follow and adapt directly from the central government policy (both the policy advice and regulatory direction).
2. Shanghai often chooses (or tries to choose) to balance the implementation of central policy with the preservation of local economic vitality (especially aiming at economic and business engagement with mixed market).
3. Shenzhen usually has a stronger incentive to experiment with localisation in accordance with central government regulations to better protect local economic development and business dynamics. An economic sanction approach is more attempted.

However, there is an increasingly clear trend emerging in all three localities, towards close

alignment with central policy. Under the name of “Internet Financial Fraud and Anti-Money Laundering Governance”, the cracking down on blockchain and cryptocurrency-relevant fields.

In line with the regulatory context, Beijing entrepreneurs are at the forefront of promoting blockchain applications, and do so in line with the state’s infrastructure and risk-management aims. China’s tech powerhouse, Shenzhen, in contrast, lags far behind in number. Rather than being full of world-leading blockchain companies, serving large markets and pushing the technological frontier, there are only 34 blockchain companies headquartered in Shenzhen. This suggests that entrepreneurs pursuing business applications of blockchain choose to do so more in Beijing, even though there are obvious opportunities around the financial markets and global clientele in Shanghai, and in the Shenzhen high-tech hub alongside Tencent and Huawei.

As Table 1 details, it is public-customer-centric Beijing that has the largest number of blockchain companies, with Shenzhen home to just a third as many.

	Beijing	**Shanghai**	**Shenzhen**
Blockchain application	Infrastructure and services	Financial services	Crypto
Type of customer base	Public	Private	Private
Geography of customer base	Domestic	Mixed	Global
Number of firms	110	53	34
Business Focus: Pattern Analysis	1. **State Project** **2. Public Project** 3. **Policy** Orientation	1. **Financial** Service 2. **International** Market Orientation 3. Software and **Business Platform Provider**	1. **Commercial** project 2. Hardware and Information Platform Provider 3. **Domestic** Market Orientation
Business Type (Company PR and Description Content Analysis)	Domestic Public Procurement Market (Governmentality + Policy)	International Commercial Market (Service + Platform)	Domestic Commercial Market (Application+ Product+ Industrialization)
Investor Portrait (Character Analysis & Feature Summary)	State Sponsorship and Investment (Government Fund, Sovereign Fund and State-sponsored Fund/Financial Entity)	Global Sponsorship and Investment (International VC and Hybrid VC supported by both Chinese and Global Capitals)	Domestic Sponsorship and Investment (Domestic VC, Domestic Investor and Financial Entity)

Source: author analysis based upon Crunchbase data, analysed using R packages.

We discuss the nature of the contemporary blockchain ecosystems in Beijing, Shanghai, and Shenzhen, in turn below, to help explain why Beijing is at the forefront.

Beijing: Infrastructure and services for public, domestic markets

Zhongguancun Science and Technology Park in Beijing is famously known as the Silicon Valley of China, and it has been one of the most prominent incubators for tech companies and innovation products since late 1980s. Our studies find that there is a growing number of blockchain companies flourishing – around public customers, a domestic market, and a long timeframe - their business activities since 2016.

Commercial orders and purchases come (in)directly from a government authority, such as different ministries, local Beijing government, government units in other localities and SOEs at different administrative levels. Predominately, the public procurement business is based on open bids at the outsourcing platform company established by the government. For example, our translation of D Community, a Beijing-based blockchain traffic platform aiming to facilitate a public service-based blockchain technology ecosystem for social goods, shows their business strategy as "*The blockchain-based smart traffic and big data platform project is a strategic development field for D community, and the D community aims every effort to coordinate and lead a sustainable development agenda for the digital transformation of social governance in different areas*."

Beijing-based blockchain companies articulate their 'transparency' and 'trustfulness', as how they could propel the formation and transformation of an innovative social governance management system. Blockchain companies' strategies reflect the national developmental agenda, such as the 13th Five Year Plan. They strive to meet various requirements from the state in terms of algorithm, application (hardware/software) and platform (mixed entity), but also lead the ongoing and future direction of functional orientation and policy (regulation/compliance) invention.

Beijing-headquartered blockchain companies tend to pursue a longer time horizon. For example, they undertake a five-year project on an airport international logistics blockchain platform aiming to complying with a regional or national medium-term developmental plan. They adapt their innovation pipeline considering the slower public procurement processes, and are rewarded with the potential for steady public clients in return.

Shanghai: Financial service applications for mixed markets

Shanghai not only has a deep pool of local talents but also attracts a vast number of overseas returnees (sea turtles) from the West. It has a well-developed entrepreneurship ecosystem, which combines globally-engaged manufacturing and service industries and incubators for knowledge and innovation know-how for local entrepreneurs.

Globalized high-end human resources and its mighty position in the supply chain of international finance, healthcare, AI, IoT, renewable energy and more, offer Shanghai-based blockchain companies' fertile ground to grow. However, the unpredictability from tightening regulation and policy shifts add immeasurable and intangible costs for local blockchain companies.

Shanghai-based blockchain companies are increasingly innovating in areas consistent with targeted policy objectives, such as, IoT connection, supply chain transparency and pandemic control effectiveness in the healthcare sector. To illustrate, in October 2021, the General Office of the Shanghai Municipal People's Government highlighted the need to accelerate the upgrading of financial services and new forms of social development using emerging technologies represented by blockchain in the "14th Five-Year Plan for the Comprehensive Promotion of Urban Digital Transformation in Shanghai". It targets on the promotion of a deep digital transformation in the field of financial service, the overall digital transformation of economic development, and the acceleration of quality change, efficiency change and dynamic change in the comprehensive development.

Heeding this call, Shanghai-based Gingkoo provides customized blockchain technology services for the new transformation of banks, insurance and securities companies & other financial institutions and entities. Gingkoo's website explains that the company has

"participated in the construction of CNAPS system for the modernization of payment of commercial banks, cross-border RMB payment system of commercial banks and other businesses." Our translation of Gingkoo's website content goes further, as they explain that they are "one of the first companies in China to lay out blockchain technology and applications" and "the first to propose 'using blockchain to serve the real economy'".

Shenzhen: crypto for private, global markets

The home of Chinese technology giants, such as Tencent, Huawei, DJI and BYD, there are also blockchain companies in districts like Nanshan and Shekou. However, despite the centrality of Chinese tech in Shenzhen, there are only 34 blockchain companies. Why? Because crypto – the hub's early strength – is discouraged by the state, and other blockchain applications take too long to be a viable in this fast-moving market.

In the early 1980s, China's prolific reformer, Deng Xiaoping, and his comrade Yuan Geng, had a towering placard erected in the liveliest commercial street of Shenzhen's early development zone saying: "Time is money, efficiency is life". The innovation setting in Shenzhen has reflected this aim, fostering a workload pattern of "996" (working from 9am-to-9pm 6 days a week) in recent years. Today, the innovation intensity is so great – due to global market fundamentals and a non-stop work culture – in Shenzhen that the pattern has been renamed, to "007", reflecting the expectation that engineers and entrepreneurs are working from 12am-to-12pm 7 days a week).

Given the hyper-fast innovation loop, many blockchain companies in Shenzhen chose the cryptocurrency sector as their approach. This ranged from the provision of different generations of mining machines, to the optimisation of computational power networking, to the evolution on algorithm architectures in blockchain technologies, to the diversification of investments in the global Hash portfolio. Blockchain companies in Shenzhen have been trying to lead the competition in the most cutting-edge market niche in the crypto world. For example, DOBI ATM is a Shenzhen-based cryptocurrency ATM manufacturer. As evidence of its global orientation, it supports 20 languages and over 10 digital coins.

Heaven is still high, but the emperor is getting closer

Observers often quip that the Chinese state is driving its innovation system, but that it is not a monolith. Different innovation ecosystems have proliferated, and thrived, especially in the 21st century. However, as Figure 1 below, shows the variation in how blockchain start-ups describe their business is increasingly dominated by just one type: the public-service-oriented Beijing variety.

***Source**: Author analysis based upon text-as-data analysis of company websites and Crunchbase descriptions. The **Black font** represents the business product/service provided by Beijing's blockchain companies. The **Purple font** represents Shanghai's and the **Blue font** represents Shenzhen's blockchain companies.*

The increasingly visible actions by the Chinese government in the technology sector, including blockchain, suggests that there will be just one model. Either entrepreneurs focus on technological applications, like infrastructure services as exemplified by BSN, or they consider moving off-shore to pursue applications that are out of favour, with cryptocurrencies being the most extreme example. There are notable examples of Chinese blockchain entrepreneurs moving offshore to thrive (even survive) when engaging in non-Beijing-aligned business models. For instance, there is a Quebec-based cryptocurrency mining service total solution provider with the whole team comes from Shenzhen, and the Shenzhen-migrated Caribbean Region-located NFT (Non-Fungible Token) platform company.

The Yuan dynasty proverb 'Heaven is high and the emperor is far away' refers to a setting in which the government is supreme, but far away, and so one can exercise autonomy. In the blockchain context, this would mean that entrepreneurs had agency in choosing their innovation (e.g. crypto, infrastructure, or other) across each of the three Chinese cities. But, as the emperor gets closer, and still remains supreme in its power, there may be less and less distinct contextual rationalities informing technological innovations that are market-driven. Instead, innovators would either focus on infrastructure and public services, as those in Beijing do today, or relocate offshore. That state-led, monolith model, which only enables state-friendly forms of innovation in this technological frontier, may be the only one available to export.

In order to avoid that, we offer the following policy recommendations:

1. **Prioritize economic opportunity**. At present, the state is inconsistent and restrictive. For instance, the People's Bank of China, and National Development and Reform Commission (NDRC) consider the economic benefits of blockchain technology, particularly how it can contribute to long-term growth, as articulated in the planning of 13th Five Year Plan. Yet, the Central Cyberspace Administration (CCA) regards blockchain technology as a critical pillar for strengthen digital governance capacity and consolidating the national governance system. The NDRC has paid more attention to blockchain technology as a tool for the national economic system while the CCA emphasizes its risks, and implements online censorship, mixed (online and offline) monitoring, and campaign-style penalties. This has caused dilemmas in many different layers in the central system, with the result being downward pressure on entrepreneurs' ability, or willingness, to operate in an environment identified as a national security risk. They do so, almost entirely, if the government is a client, to mitigate that risk. A clearer indication of the prioritization of economic opportunity associated with the myriad applications of blockchain could help enable a more creative, and varied, field of blockchain entrepreneurs.

2. **Policy coordination using the Shenzhen special economic zone as a template.** When the central government designed Shenzhen as a special economic zone, a holistic institutional approach was taken. Experiences generated from Shenzhen's development could offer a template for the central state's engagement with blockchain as it presents a learning opportunity for policy incorporation and dissemination within the multi-layered regime, and not limited to the economic sector.

When it comes to the state's approach to the development of blockchain technology, a mechanism helping integrate different institutional functions and ecosystem actors could offer more certainty for would-be entrepreneurs, and benefit from the tradition of policy experimentation that has served China's innovation system's historical growth.

3. **Make accountability clear for entrepreneurs**. Entrepreneurs often find it difficult to figure out to whom they should be accountable. In blockchain, entrepreneurs at all three localities found it challenging to meet various requirements by different commanders/stakeholders carrying the policy(policies). Since the blockchain developmental a cross-administration policy issue in the process, the policy task actors should explain and pave a clear way to entrepreneurs, guide and create an accountability-friendly policy environment for the development.

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